REMARKS

Applicants appreciate the thorough examination of the present application as evidenced by the Final Office Action of October 30, 2006. In particular, Applicants appreciate the Examiner's indication that Claims 22 and 25-45 are allowed and that Claims 9-12 would be allowable if amended to overcome informal claim objections. *See* Final Office Action, page 12. Applicants have amended Claims 9 and 12 as suggested in the Final Office Action and, therefore, submit that Claims 9-12 are in condition for allowance for at least these reason. Applicants respectfully request entry of these amendments after final as these amendments merely correct typographical errors in the claims. Applicants respectfully submit that the remaining claims are patentable over the cited references for at least the reasons discussed herein.

The Claim Objections

Claims 9-12 stand objected to for various informalities. *See* Final Office Action, page 2. Applicants have amended Claims 9 and 12 as suggested in the Final Office Action and, therefore, submit that Claims 9-12 are in condition for allowance for at least these reasons.

The Section 102 Rejection – Independent Claim 63 is Patentable over the Cited Reference

Claims 63-67, 71, 72, 74-76, 79 and 80 stand rejected under 35 U.S.C. §102(b) as being anticipated by United States Patent No. 6,534,801 to Yoshida *et al.* (hereinafter "Yoshida"). *See* Final Office Action, page 3. Applicants respectfully submit that the rejection with respect to Claims 63-67, 71, 72, 74-76, 79 and 80 is identical to the rejection of these claims set out in the previous Office Action of April 20, 2006. *See* April 20 Action, pages 6-8. However, the Final Office Action does not contain any response to Applicants' arguments set out in Applicants' Amendment of August 15, 2006. Accordingly, Applicants respectfully submit that Claim 63 and the claims that depend therefrom are in condition for allowance for at least the reasons discussed in Applicants' Amendment of August 15, 2006, the content of which is incorporated herein by reference as if set forth in its entirety.

The Section 103 Rejection – Independent Claim 1 is Patentable over the Cited Combination

Claims 1, 5-8, 13, 15-21, 23 and 24 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Yoshida in view of United States Patent No. 5,701,019 to Matsumoto *et al.* (hereinafter "Matsumoto"). *See* Final Office Action, page 7. Applicants respectfully submit that many of the recitations of these claims are neither disclosed nor suggested by the cited references. For example, independent Claim 1 recites:

> A method of fabricating a transistor, comprising:
> forming a nitride-based channel layer on a substrate;
> forming a barrier layer on the nitride-based channel layer;
> forming a contact recess in the barrier layer to expose a contact region of the nitride-based channel layer;
> **forming a contact layer on the exposed contact region of the nitride-based channel layer using a low temperature deposition process, such that the contact layer does not extend beneath the barrier layer;**
> forming an ohmic contact on the contact layer; and
> forming a gate contact disposed on the barrier layer adjacent the ohmic contact.

Applicants respectfully submit that at least the highlighted recitations of independent Claim 1 are neither disclosed nor suggested by the cited combination for at least the reasons discussed herein.

In particular, the Final Office Action states that all of the recitations of independent Claim 1 are taught by Figures 1 through 5 of Yoshida except that Yoshida does not disclose forming the contact layer such that the contact layer does not extend beneath the barrier layer. *See* Final Office Action, page 7. However, the Final Office Action points to Matsumoto as providing the missing teachings. *See* Final Office Action, page 8. Applicants respectfully disagree.

The Final Office Action states that the GaN layer 5 of Yoshida teaches the contact layer as recited in independent Claim 1. *See* the Final Office Action, page 7. As discussed in Yoshida:

> Thereafter, **a selective growth method, for example, is used to form the n-type GaN layer** on the exposed undoped GaN layer 3, using Si, for example, as the n-type impurity. Simultaneously, the undercut portion 4a is buried by the n-type GaN (FIG. 5). . .
> Thereafter, **a selective growth was effected by using metal Ga (5×10^{-7} Torr) as a Ga source, ammonia (5×10^{-6} Torr) as an N source and Si (5×10^{-8}**

> **Torr) as an n-type impurity, thereby burying the undercut portion 4a and forming an n-type GaN layer 5 with a thickness of 40 nm, as shown in FIG. 5.** The Si concentration in the n-type GaN layer was 2 X 10^{19} cm^{-3}.

See Yoshida, column 4, lines 11-16 and column 5, lines 9-15 (emphasis added). Thus, the GaN layer of Yoshida is formed using a "selective growth method" as discussed therein. In stark contrast, Claim 1 recites "forming a contact layer on the exposed contact region of the nitride-based channel layer **using a low temperature deposition process**." Nothing in Yoshida discloses or suggests using such a low temperature deposition process to form the contact layer.

Matsumoto does not provide the missing teachings. In fact, the Final Office Action admits that Matsumoto does not disclose the "low temperature process" as recited in the claims of the present application. *See* Final Office Action, page 11. Accordingly, Applicants respectfully submit that none of the cited references, either alone or in combination, disclose or suggest at least these recitations of Claim 1 and, thus, Claim 1 and the claims that depend therefrom are in condition for allowance for at least the reasons discussed herein.

As discussed above, the Final Office Action admits that Yoshida does not disclose or suggest forming the contact layer such that the contact layer does not extend beneath the barrier layer. *See* Final Office Action, page 7. The Final Office Action points to Figure 3(d) of Matsumoto as providing the missing teachings. *See* Final Office Action, page 8. Applicants respectfully submit that there is no motivation or suggestion to combine the cited references as suggested in the Final Office Action.

As affirmed by the Court of Appeals for the Federal Circuit in *In re Sang-su Lee*, a factual question of motivation is material to patentability, **and cannot be resolved on subjective belief and unknown authority**. *See In re Sang-su Lee*, 277 F.3d 1338 (Fed. Cir. 2002). It is improper, in determining whether a person of ordinary skill would have been led to this combination of references, simply to "[use] that which the inventor taught against its teacher." *W.L. Gore v. Garlock, Inc.*, 721 F.2d 1540, 1553, 220 U.S.P.Q. 303, 312-13 (Fed. Cir. 1983). The Final Office Action states:

> Since Yoshida and Matsumoto are from the same field of endeavor, the purpose disclosed by Matsumoto would have been recognized in the pertinent prior art of Yoshida.
>
> Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the method disclosed by Yoshida as

> suggested by Matsumoto because of the desirability to minimize the capacitance between the gate and drain.

See Final Office Action, page 8. Applicants respectfully disagree.

The motivation provided in the Final Office Action set out above is, at most, a motivation based on "subjective belief and unknown authority," the type of motivation that was rejected by the Federal Circuit in *In re Sang-su Lee*. In other words, the Final Office Action does not point to any specific portion of the cited references that would induce one of skill in the art to combine the cited references as suggested in the Final Office Action. If the statement in the Office Action were adequate to sustain the Office's burden, then anything that would provide "minimize the capacitance between the gate and drain" would be rendered obvious. This cannot be the case. Accordingly, the statement in the Final Office Action with respect to motivation does not adequately address the issue of motivation to combine as discussed in *In re Sang-su Lee*. Thus, it appears that the Final Office Action gains its alleged impetus or suggestion to combine the cited references by hindsight reasoning informed by Applicants' disclosure, which, as noted above, is an inappropriate basis for combining references. Accordingly, Applicants respectfully submit that Claim 1 and the claims that depend therefrom are patentable over the cited combination for at these reasons.

Furthermore, as discussed in Matsumoto:

> Methods of fabricating the semiconductor device according to the present invention will now be described by way of examples, which are adapted to an AlGaAs/GaAs hetero-junction FET. These examples are illustrative of the present invention and are not limiting. The steps of fabrication are shown in FIGS. 3(a)-3(d), wherein the length L of FIG. 1 is 0 μm.
>
> A fabrication method according to the present invention employs a step of forming a surface oxide film 10 by oxidizing **the side surfaces of the n-type GaAs channel layer 3 and side surfaces of the undoped AlGaAs barrier layer 4 that are exposed by etching**, a step of selectively removing the surface oxide film 10 from the side surfaces of the channel layer 3 while leaving the surface oxide film formed on the side surfaces of the barrier layer 4, and a step of selectively growing the contact layer 6 on the regions inclusive of side surfaces of the channel layer 3 by using, as a mask, the surface oxide film 10 that is left on the side surfaces of the barrier layer **Thus, the contact layer is formed so as not to be in contact with the side surfaces of the barrier layer 4.**

See Matsumoto, column 3, lines 9-30. In other words, the contact layer 6 of Matsumoto is formed so that it does not contact the side surfaces of the barrier layer 4. *See also* Figure 3(d) of Matsumoto. Furthermore, this lack of contact with the barrier layer 4 is the aspect of

Matsumoto that may enable "capacitance between the gate and drain to be decreased." *See* Matsumoto, Abstract. As is clearly illustrated in Yoshida, the GaN layer (contact layer) 5 clearly contacts the side surface of the undoped AlGan layer (barrier layer) 4 and the undoped AlGaN layer 5 extends beneath the GaN layer 5. Accordingly, Applicants respectfully submit that one of skill in the art would not be motivated to combine the cited references for at least these additional reasons.

Accordingly, Applicants respectfully submit that Claim 1 and the claims that depend therefrom are in condition for allowance, which is respectfully requested in due course.

The Remaining Dependent Claims

A. Claims 77 and 78 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Yoshida in view Matsumoto. *See* Final Office Action, page 5. As discussed above, the dependent claims are patentable at least per the patentability of the independent base claims from which they depend. Accordingly, Applicants respectfully submit that dependent Claims 77 and 78 are patentable over the cited references for at least the reasons discussed herein.

B. Claims 2-4 stand rejected under 35 U.S.C. § 103(as) as being unpatentable over Yoshida in view of Matsumoto and in further view of United States Patent No. 6,533,874 to Vaudo *et al.* *See* Final Office Action, page 11. As discussed above, the dependent claims are patentable at least per the patentability of the independent base claims from which they depend. Accordingly, Applicants respectfully submit that dependent Claims 2-4 are patentable over the cited references for at least the reasons discussed herein.

CONCLUSION

In light of the above discussion, Applicants submit that the present application is in condition for allowance, which action is respectfully requested. If, in the opinion of the Examiner, a telephonic conference would expedite the examination of this matter, the Examiner is invited to call the undersigned attorney at (919) 854-1400.

Respectfully submitted,

Elizabeth A. Stanek
Registration No. 48,568

Customer No. 20792
Myers Bigel Sibley & Sajovec, P.A.
P. O. Box 37428
Raleigh, North Carolina 27627
Telephone: (919) 854-1400
Facsimile: (919) 854-1401

CERTIFICATION OF ELECTRONIC TRANSMISSION UNDER 37 CFR § 1.8

I hereby certify that this correspondence is being transmitted electronically to the U.S. Patent and Trademark Office on **January 2, 2007** using the EFS.

Erin C. Dutton